Response Under 37 CFR 1.116
Expedited Procedure
Examining Group 1753

Remarks

Claim Objections

The spelling of "substrate" was objected to in claim 7. Claim 7 is amended in this Amendment After Final Action, and hence, the incorrect spelling is no longer an issue.

Claim Rejections Under 35 USC 112

Claims 1 and 36 are rejected under 35 USC 112 as being indefinite.

In claim 1, it has been clarified that a low film stress is achieved by adjusting the angle of incidence.

Claim 36 has been amended to remove the phrase "by a lithography method".

Amendments to the Claims

The claims are amended to overcome the prior art.

The previous amendment to claim 7 has been withdrawn. Claim 7 depends on claim 1.

Claim 6 has been drafted as an independent claim. The feature of a deposition rate of at least 0.01 nm/s has been replaced by a deposition rate of at least 0.05 nm/s. This deposition rate is supported in the specification.

In Claim 27, the feature of cleaning impurities by the second particle beam has been replaced by the feature of increasing the reflectance by a Xenon ion beam.

Claims 28, 42, and 43 have been canceled.

In claim 30, the feature of claim 32 has been included, i.e., the feature of deposited layers having a grain size of 0 to 10 nm.

Claim 37 has been amended analogously to claim 1. Accordingly, claim 37 now defines an apparatus, wherein the angle of incidence of the sputtered target atoms is adjustable.

Claim Rejections Under 35 USC 103

Patentability of Claims 1-6, 24, 25, 28-31 and 43 over Carcia in view of Kureishi

Claim 1 now defines that the film stress is optimized by adjusting the angle of incidence of the sputtered target atoms onto the substrate.

Indeed, Kureishi discloses a low film stress, as stated in the Office Action. However, Kureishi's method is common magnetron sputtering. The films deposited therewith usually have lower density compared to layers deposited by ion beam deposition. Kureishi proposes to densify the deposited layers by an additional ion beam and thereby relax the film stress. However, a person of ordinary skill in the art would not have considered combining this densification method with ion beam deposition. As ion beam deposited films are considerably denser than magnetron sputtered films, the person of ordinary skill in the art would not expect that further densification would result in a reduction of the film stress being achieved.

Moreover, in contrast to both Carcia and Kureishi, claim 1 defines that the film stress is not adjusted by irradiating with a second ion beam, but rather, by adjusting the angle of incidence of the sputtered target atoms.

Accordingly, the subject matter of claim 1 cannot be obtained by combining Carcia with Kureishi.

As claim 29 defines a photo-mask blank obtainable by the method as defined in claim 1 and claim 37 defines an apparatus wherein the angle of incidence of the

sputtered target atoms is adjustable to optimize the film stress to about 0.2 MPa, this also holds for claims 29 and 37.

Further, independent claim 6 defines that the deposition rate is between 0.05 and 5 nm/s. In this respect, the Office Action argues that Carcia would disclose a deposition rate of greater than 0.1 nm/min.

However, a deposition rate of 0.1 nm per minute as disclosed in Carcia corresponds to a deposition rate of $1.6^* 10^{-3}$ nm per second. Compared to the deposition rates of between 0.05 and 5 nm per second, this value disclosed in Carcia is at least about 30 times smaller than the range as defined in claim 6. Accordingly, the subject matter of claim 6 is new with respect to Carcia.

Further, claim 30 now defines that the grain size of the deposited layers is 0 to 10 nm. None of the prior art documents exhibit this feature. Accordingly, the subject matter of claim 30 is new.

Patentability of Claim 27 over Carcia in view of Scott

Claim 27 now defines that the reflectivity of the surface is enhanced by irradiating with Xenon-Ions using the assist source. The Office Action argues that, with respect to claim 26, it would have been obvious to employ a Xenon Ion beam for polishing. According to the Office Action, use of Xenon would be known from Carcia. However, although Carcia teaches employing Xe ions for sputtering the target, it is not disclosed that the reflectivity of the deposited layers can be improved.

Further, both Mirkarimi and Yakshin disclose ion assisted deposition methods, where a flattening is achieved by irradiating with a second or assist

particle beam (whereby only Mirkarimi mentions Xenon). Accordingly, none of the documents cited disclose enhancing the reflectivity by using Xenon sputter gas.

Thus, even if a person skilled in the art would combine these documents, he would not arrive at the present invention, as he could not conclude that the reflectivity may be enhanced by sputtering with Xenon ions.

Double Patenting Rejection

If the Examiner believes that a terminal disclaimer is necessary after reviewing the current submission, Applicant is willing to file such a disclaimer.

Wherefore further consideration and allowance of the claims, as amended, is respectfully requested. The present Amendment to the claims is necessary to make the claims allowable, or to place this case in better condition for appeal.

Applicant respectfully believes that the present submission places the claims in condition for allowance.

Response Under 37 CFR 1.116
Expedited Procedure
Examining Group 1753

A one-month extension of time in which to respond to the outstanding Office Action is hereby requested. Credit Card Payment Form PTO-2038 in enclosed to cover the prescribed Large Entity one-month extension fee of $120. An RCE is included herewith, and hence, the $790 RCE fee is also charged to the credit card.

Respectfully submitted,

M. Robert Kestenbaum
Reg. No. 20,430
11011 Bermuda Dunes NE
Albuquerque, New Mexico 87111
Phone (505) 323-0771
Fax (505) 323-0865

I hereby certify this correspondence is being submitted by facsimile transmission to Commissioner for Patents, Alexandria, Va. 22313-1450 on June 9, 2006, fax number (571) 273-8300.

M. Robert Kestenbaum